

TEMPERATURE COMPENSATED FIBER-OPTIC PRESSURE SENSOR

Abstract.

5 Compensation techniques for high temperature fiber-optic pressure sensors are aimed at correcting for the sensor sensitivity and offset dependence on temperature. By using materials of different thermal expansion coefficients for the sensor diaphragm, housing, ferrule and fiber-bonding compound and by optimizing the length of such parts, the relative distance of the fiber tip with respect to the sensing diaphragm changes in a manner that reduces sensor sensitivity and/or offset dependence on temperature. In the first embodiment, the distance change results from controlled fiber movement within the ferrule and is used to reduce the temperature sensitivity of dynamic sensors. In the second embodiment, an optimum selection of the diaphragm, housing, ferrule and bonding compound materials yields a stable fiber position within the ferrule but, instead, a well defined ferrule movement with respect to the diaphragm in response to temperature changes. The latter technique is used to reduce the offset error of static sensors or the sensitivity error of dynamic sensors.

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